Solid-State Reactivity in Halogen-Bonded Co-Crystals. Pierangelo Metrangolo\textsuperscript{a,b}, Serena Biella\textsuperscript{a,b} Gabriella Cavallo\textsuperscript{a}, Tullio Pilati\textsuperscript{b}, Giuseppe Resnati\textsuperscript{b,c}, Giancarlo Terraneo\textsuperscript{a,b,}\textsuperscript{c}. NFMLab - D.C.M.I.C. "Giulio Natta", Politecnico di Milano, Via L. Mancinelli 7, 20131 Milan, Italy. \textsuperscript{a}CNST - IIT@POLIMI, Politecnico di Milano, Via G. Pascoli 70/3, 20133 Milan, Italy. \textsuperscript{c}C.N.R. - I.S.T.M., University of Milan, Via C. Golgi 19, 20133 Milan, Italy. E-mail: pierangelo.metrangolo@polimi.it

Halogen bonding (XB) \cite{1} defines any noncovalent interaction directed towards the positive region of the electrostatic potential surface of halogen atoms \cite{2}. XB has increasingly facilitated the assembly of diverse host-guest solids \cite{3}. In this contribution, we show the application of this rather new intermolecular interaction in the control of solid-state reactivity in the context of co-crystals. Examples ranging from templated \cite{2+2} photoreactions \cite{4} to gas-to-solid reactions will be presented. In particular, it will be shown that a well-known class of organic salts, bis(trimethylammonium) alkane diiodides, can reversibly encapsulate I\textsubscript{2} \cite{5} and a series of α,ω-diodoperfluoralkanes \cite{6} directly from the vapour phase, yielding the same product formed from solution despite a lack of porosity of the starting lattice structure.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure1.png}
\caption{Diagram of halogen bonding interaction.}
\end{figure}


Keywords: Halogen Bonding, Solid State Reactivity, Templated Photoreaction

Confinement of 1,3-dimethylcyclobutadiene and intermediates in a crystalline matrix \textsuperscript{*}. \textsuperscript{Y.-M. Legrand, A. van der Lee, M. Barboiu; accepted for publication in Science (2010)}

Tweezers and zigzags – models for sequence specific tweezer-polymer interactions. Christine Cardin, Yu Gan, Zhixue Zhu, Howard Colquhoun. Department of Chemistry, university of Reading, Whiteknights, Reading, RG6 6AD, UK. E-mail: c.j.cardin@rdg.ac.uk

Intense current interest in the design of multi-component, nanoscale molecular assemblies has led to the exploitation of many types of intermolecular interaction, including π-stacking between aromatic donor and acceptor sites. This type of interaction has recently enabled the fabrication of nanoscale devices including light- and redox-driven switches and molecular logic-gates. In view of the relatively labile nature of the N-benzylpyridinium linkage on which much research into π-stacked molecular assemblies has so far depended, Professor Colquhoun has recently developed a new class of supramolecular materials based on aromatic poly(amide-sulfone) chemistry. Linear and macrocyclic materials of this type display extreme thermochemical stability and readily form π-stacked donor-acceptor complexes with polycyclic hydrocarbons such as pyrene.

Most importantly, sequence-selective complexation of the imide residues in aromatic co-polyimides by a pyrene-based molecular tweezer enables monomer-sequence information to be read by the tweezer and reported through sequence-dependent 1H NMR complexation shifts. These very significant discoveries in molecular information-processing have been crucially dependent on single-crystal X-ray analyses of tweezer-complexes with linear and cyclic oligo-imides. Tweezer-chain binding has thus been shown to arise not only from π-π stacking interactions but also from N-H...O and C-H...O hydrogen bonding, and from polymer chain-folding. Crystallographic data of this type are of the utmost importance for predictive computational modelling of tweezer-polymer interactions.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure2.png}
\caption{Diagram of tweezer-polymer interaction.}
\end{figure}

\textsuperscript{*}Y.-M. Legrand, A. van der Lee, M. Barboiu; accepted for publication in Science (2010)

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